Science & Technology Facilities Council
Rutherford Appleton Laboratory

Adding Secure Services to ESG

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NATIONAL CENTRE FOR ATMOSPHERIC SCIENCE
NATURAL ENVIRONMENT RESEARCH COUNCIL

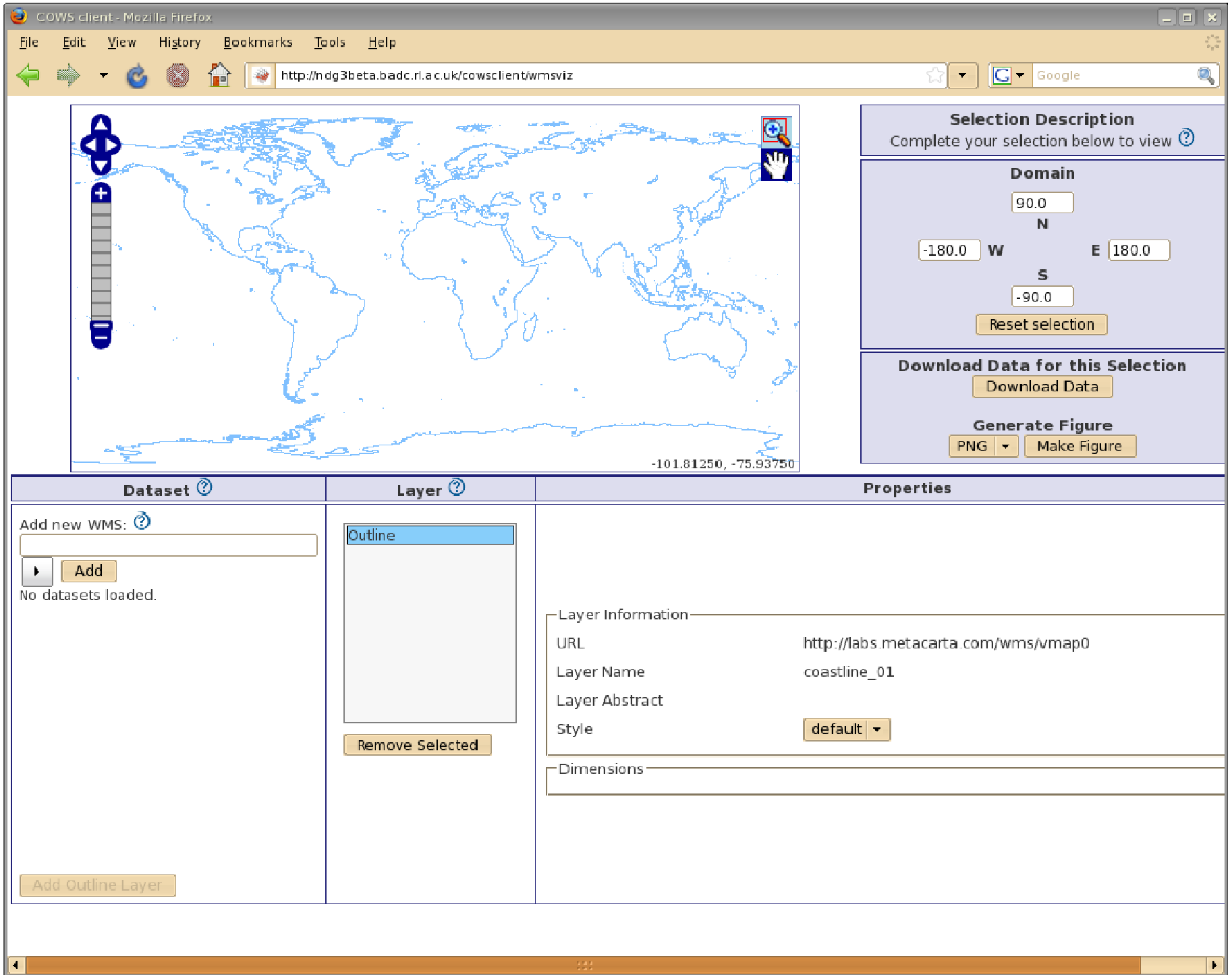
Introduction

Cows access control in Oxfordshire

- Overview of access control architecture for ESG
  - What are the interfaces required in order for an institution to link with other organisations in the federation?
- How is this being implemented with data access services at the BADC:
  - Securing PyDAP the Python OPeNDAP implementation
  - And COWS: Our Python based OGC services implementation

Federation Security 'Glue'

- What are the security interfaces between organisations?
- Security software needs to address:
  - Who are you?
  - … but not enough we also need, to answer: *Where are you from?*
    - **OpenID** – identity URL
    - **MyProxy** – user certificate
    - In both case they identify *you* and your *home institution*
  - What can you do? – user attributes
    - **Registration Service** registers user with given attribute(s)
    - **Attribute Service** enables an authorisation service to query user's attributes
- The interfaces are:
  - OpenID
  - MyProxy
  - Attribute Service
  - Registration Service
- Demonstrating …


COWS client - Mozilla Firefox
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Add new WMS:
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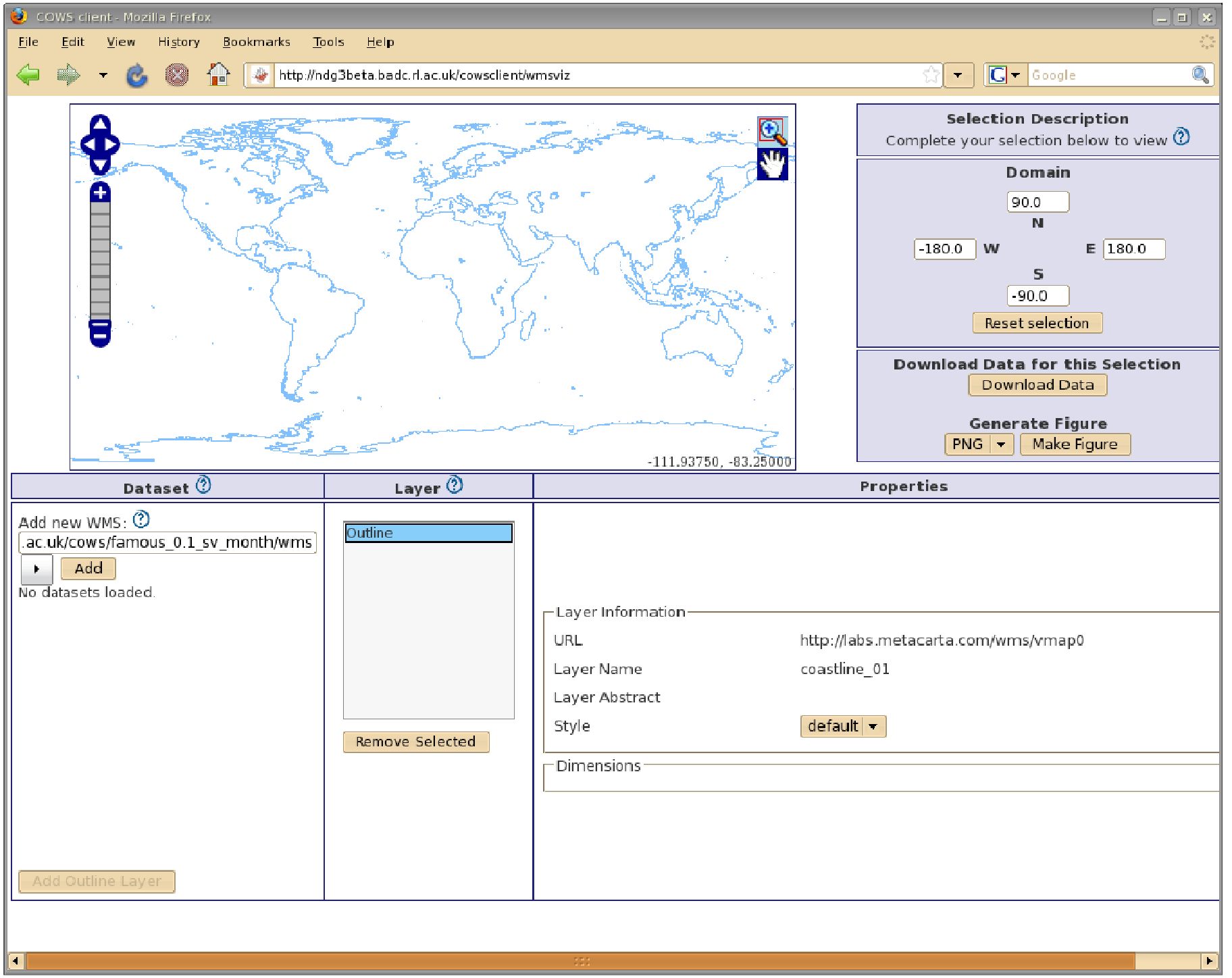
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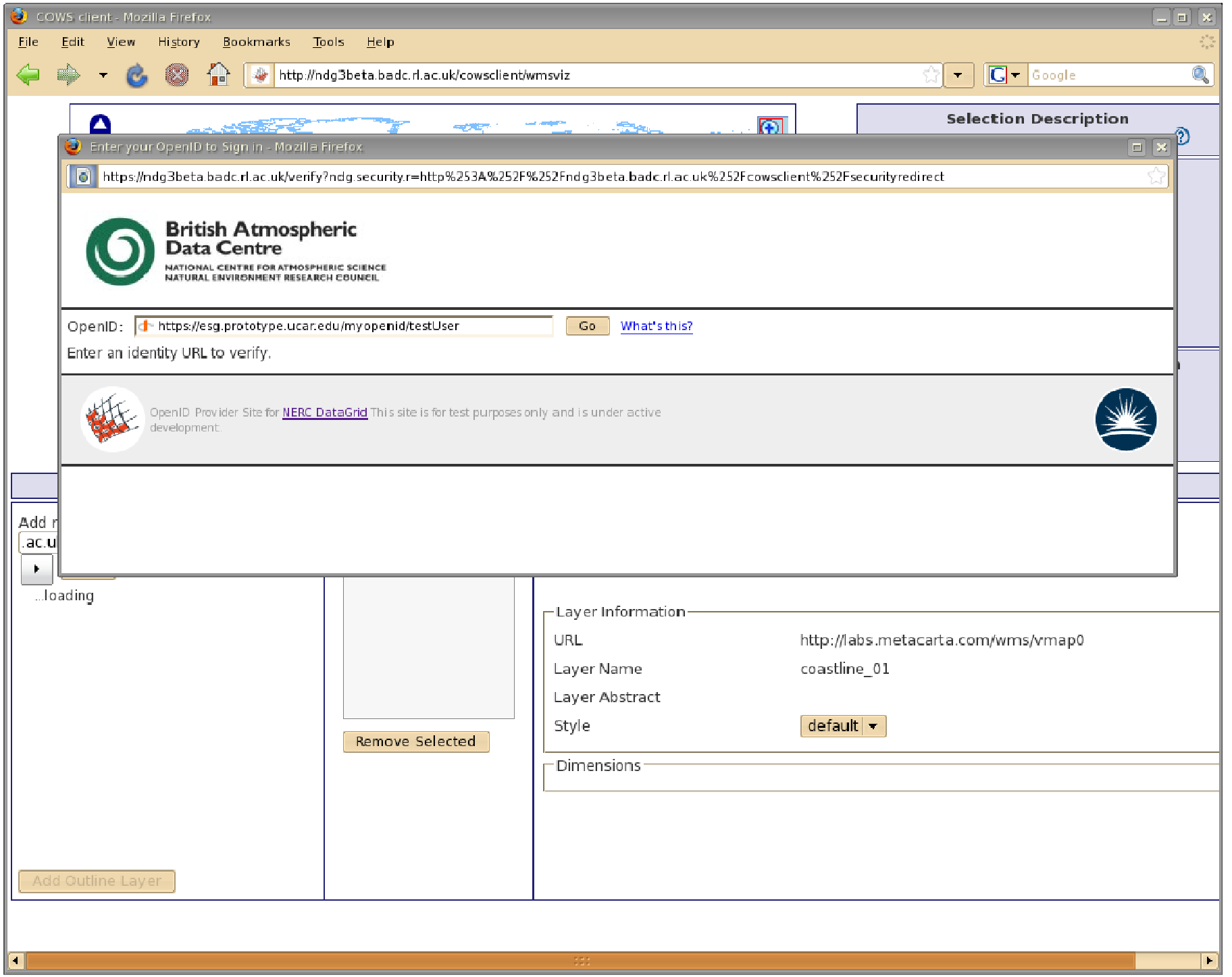
COWS client - Mozilla Firefox
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http://ndg3beta.badc.rl.ac.uk/cowsclient/wmsviz
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Selection Description
Enter your OpenID to Sign in - Mozilla Firefox
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OpenID: https://esg.prototype.ucar.edu/myopenid/testUser
Go
What's this?
Enter an identity URL to verify.
OpenID Provider Site for NERC DataGrid This site is for test purposes only and is under active development.
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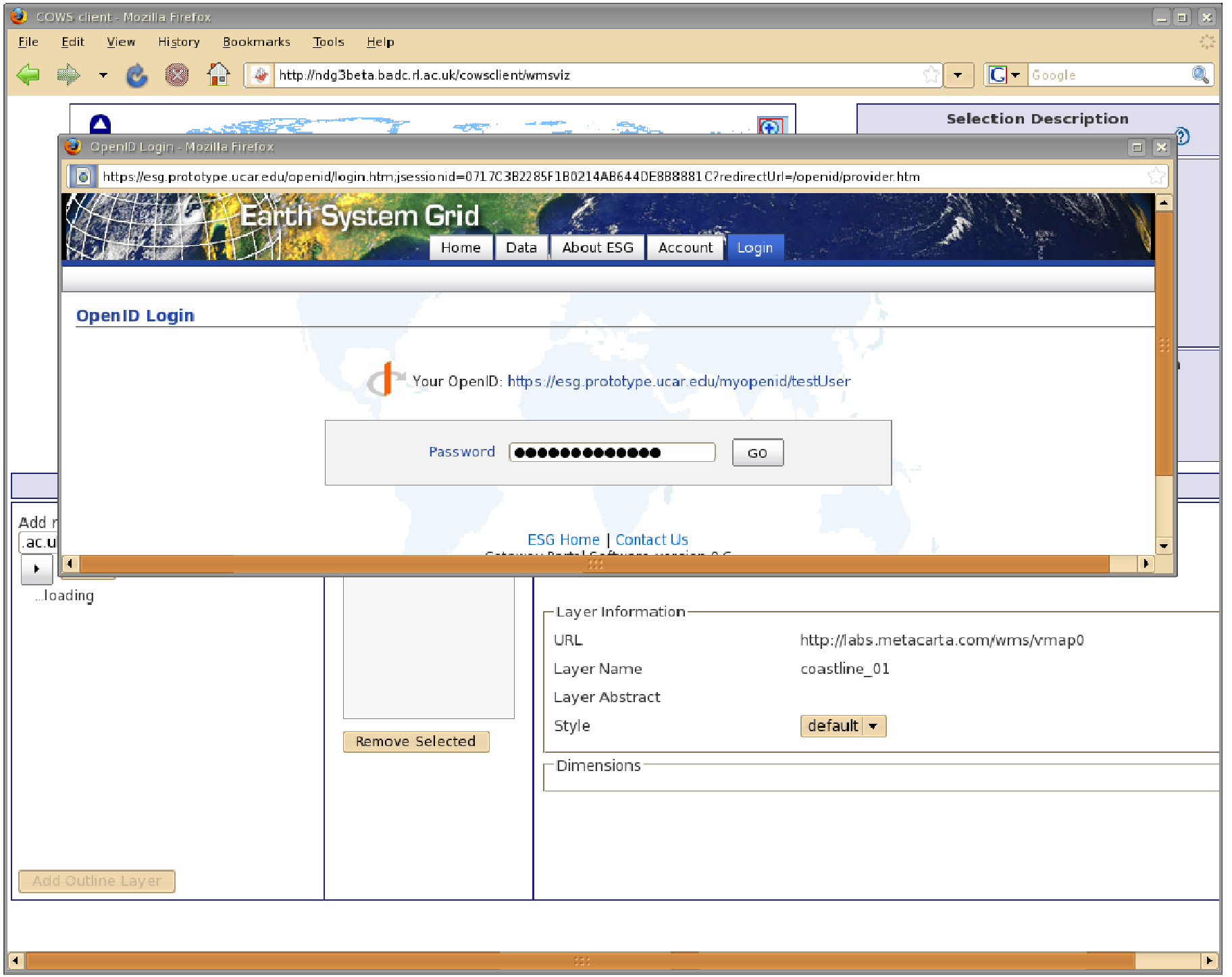
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OpenID Login - Mozilla Firefox
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Earth System Grid
Home
Data
About ESG
Account
Login
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Your OpenID: https://esg.prototype.ucar.edu/myopenid/testUser
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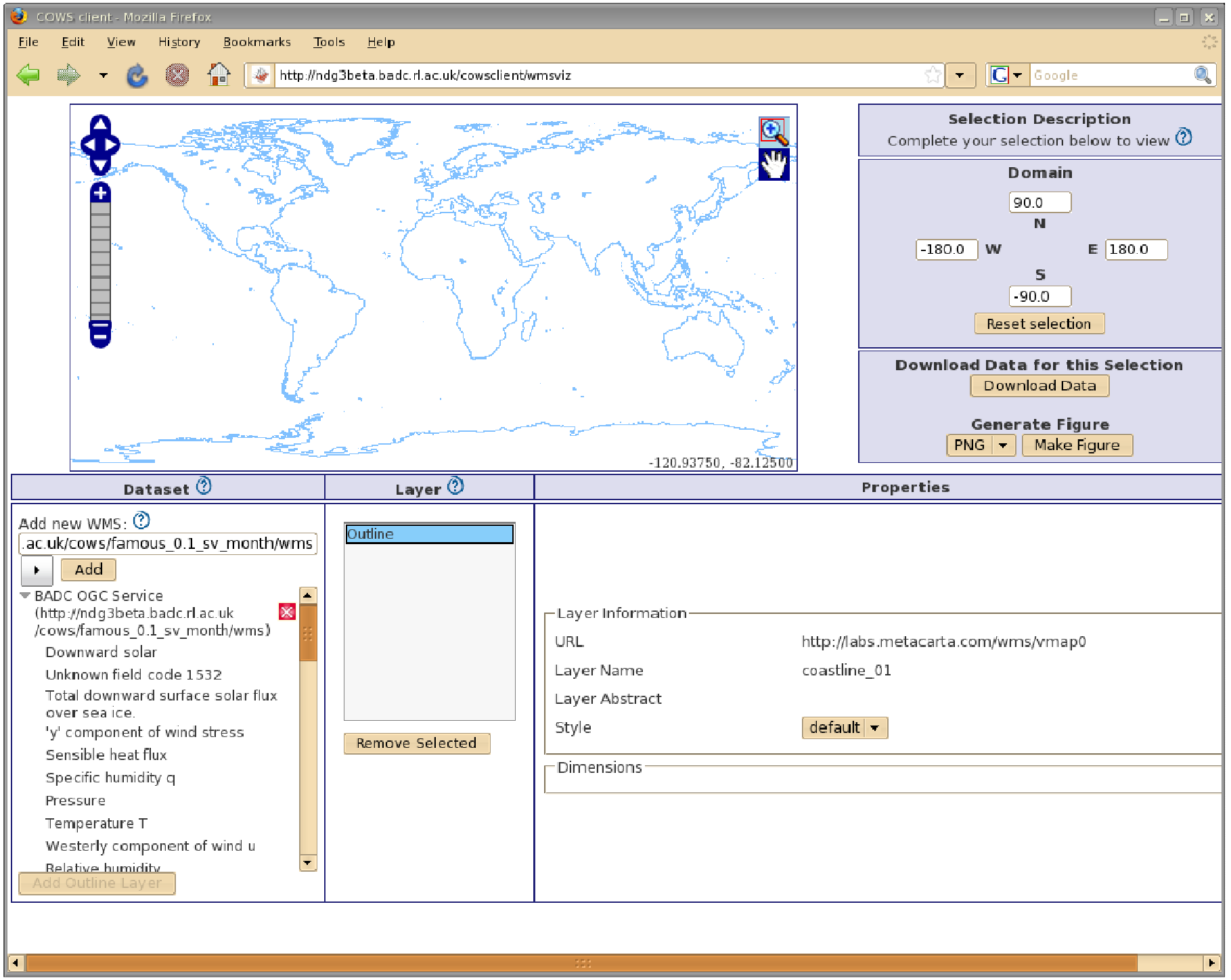
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Download Data for this Selection
Download Data
Generate Figure
PNG
Make Figure
Dataset
Layer
Properties
Add new WMS:
.ac.uk/cows/famous_0.1_sv_month/wms
Add
BADC OGC Service
(http://ndg3beta.badc.rl.ac.uk
/cows/famous_0.1_sv_month/wms)
Downward solar
Unknown field code 1532
Total downward surface solar flux over sea ice.
'y' component of wind stress
Sensible heat flux
Specific humidity q
Pressure
Temperature T
Westerly component of wind u
Relative humidity
Add Outline Layer
Outline
Remove Selected
Layer Information
URL
http://labs.metacarta.com/wms/vmap0
Layer Name
coastline_01
Layer Abstract
Style
default
Dimensions

COWS client - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://ndg3beta.badc.rl.ac.uk/cowsclient/wmsviz

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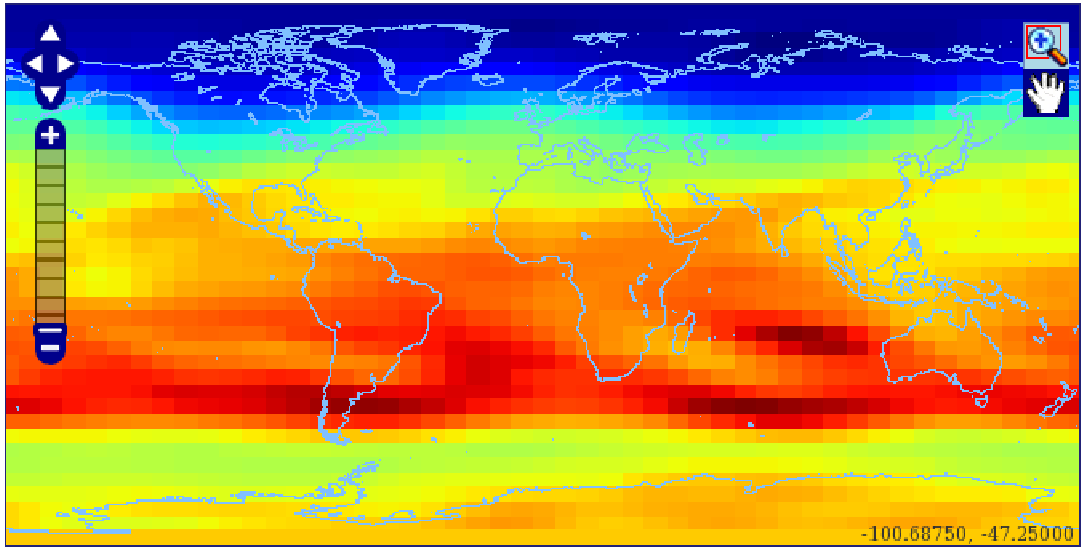

Selection Description

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Reset selection

Download Data for this Selection

Download Data

Generate Figure

PNG Make Figure

Dataset	Layer	Properties

Add new WMS:

.ac.uk/cows/famous_0.1_sv_month/wms

Add

BADC OGC Service (http://ndg3beta.badc.rl.ac.uk/cows/famous_0.1_sv_month/wms)

- Downward solar
- Unknown field code 1532
- Total downward surface solar flux over sea ice.
- 'y' component of wind stress
- Sensible heat flux
- Specific humidity q
- Pressure
- Temperature T
- Westerly component of wind u
- Relative humidity

Add Outline Layer

Outline

#0 air_temperature

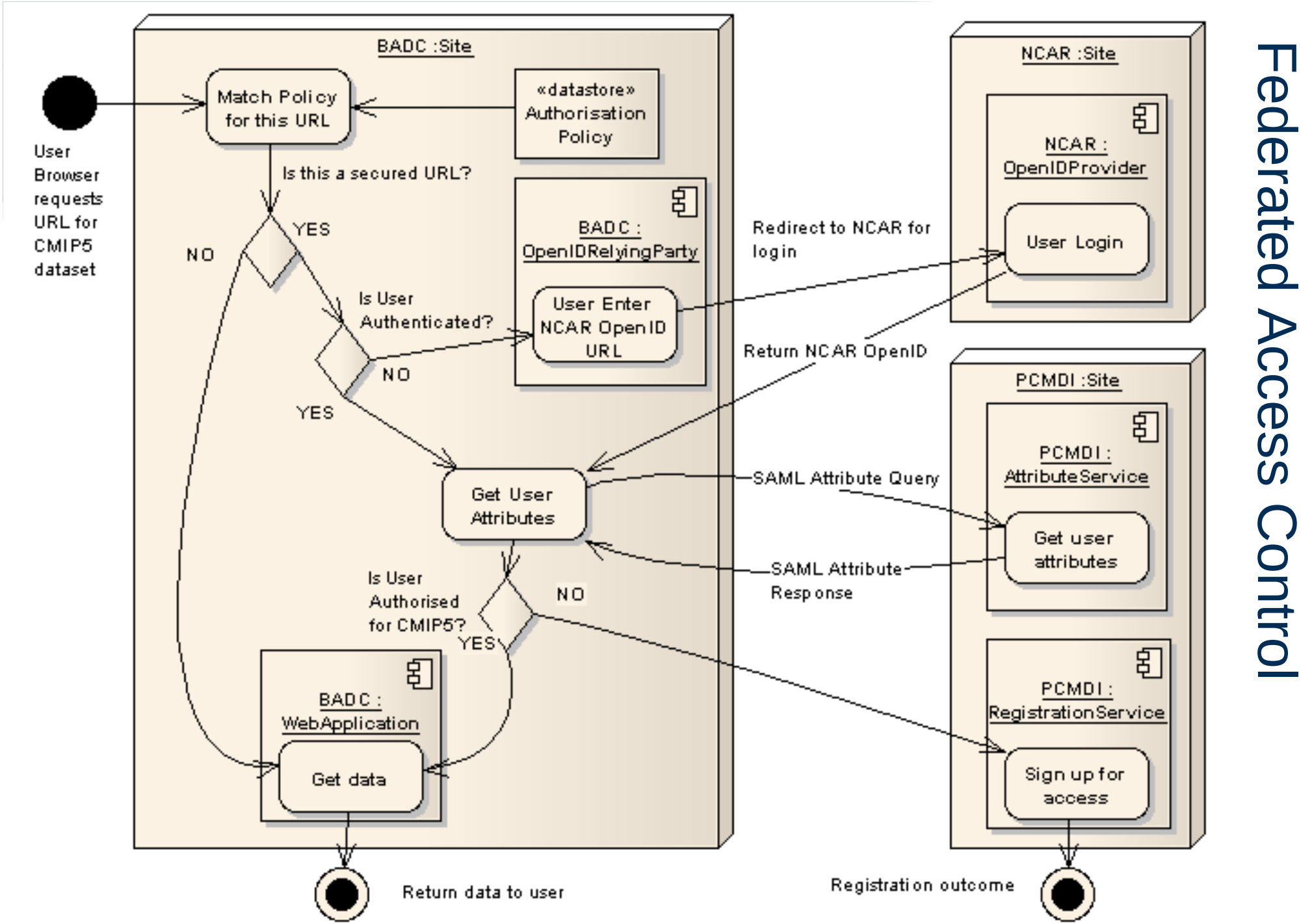
Remove Selected

Layer Information

URL	http://labs.metacarta.com/wms/vmap0
Layer Name	coastline_01
Layer Abstract	
Style	default

Dimensions

Federated Access Control



Python WSGI Middleware

- Building blocks for server side middleware
- Each middleware piece can intercept an incoming client request and operate on it or pass it to the next in a chain
- Server side functionality can be assembled from ‘prefabricated’ units in a flexible manner at deployment in a configuration file:

```
[pipeline:main]
pipeline = AuthenticationFilter
           AuthorisationFilter
           OpenIDRelyingPartyFilter
           PyDAPServerApp
```

Non-Browser Based Access

- OpenID is unsuitable for non-browser based HTTP clients
- These are important for download services and services like OPeNDAP
- Require single sign-on: address *who are you?* but also *where are you from?*
- MyProxy fits e.g.

```
$ python
>>> from myproxy.client import MyProxyClient
>>> myProxy = MyProxyClient(hostname='myproxy.ceda.ac.uk')
>>> certificate, privateKey = myproxy.logon('philipk', <password>)
```

Secure wget OPeNDAP Request

$ wget http://ndg3beta.badc.rl.ac.uk/dap/rapid/chime/.../chime_co2_1pc_daily_0060_197.oc.nc --no-check-certificate --certificate=./user.crt --private-key=./user.key --keep-session-cookies --save-cookies=cookie.txt --cookies=on

- The server security middleware intercepts the request and redirects the client to HTTPS endpoint in for authentication
- wget follows the redirects and the user certificate and key obtained from MyProxy authenticate the request against a SSL endpoint
- The server sends another redirect request back to the original netCDF data URL passing a session cookie
- Subsequent requests can use the session cookie saved to avoid the need to re-authenticate
- With this overall method:
  - no modification to the request URL is needed
  - User attribute gathering and authorisation are abstracted away from the client

Security Hooks for OPeNDAP Clients

- We want to collaborate with the OPeNDAP development community to agree a standard security interface
- incorporate the security hooks to enable access for:
  - C, Java and Fortran APIs
  - Application software like IDL and Matlab
- Ensure other OPeNDAP servers can interoperate

Summary

- ESG Secured services deployed at NERC DataGrid beta site:
  - COWS OGC Client: http://ndg3beta.badc.rl.ac.uk/cowsclient/wmsviz
  - Secured PyDAP OPeNDAP Server: http://ndg3beta.badc.rl.ac.uk/dap
- Secured browser based and wget based access available
- Standards based solution has enabled interoperability across implementations: ESG Java – BADC Python
  - Lowered the barriers for broader participation of organisations in the federation
- Next steps: production OpenID and MyProxy deployments at CEDA/BADC
- Questions?